

II. REMARKS:

Applicant requests favorable reconsideration of the Application. As set out in more detail below, Applicant has amended Claims 2, 3, 9 & 20 in a manner which is believed to traverse the Examiner's rejections under 35 U.S.C. § 112. Language in the amendments to the claims is fully supported by the specification, and no new matter has been added. Applicant has provided a Marked-Up set of claims and a Claim List – Status and Support of Current Amendment Changes. For the Examiner's convenience, the substance of the pending Office Action is set out below followed by Applicant's respective responses and remarks.

Examiner's Arguments and Responses by Applicant**A. The Examiner's Statements Pertaining to the IDS**

The EPA Project Summary listed on the IDS filed 7/13/04, i.e., "Effect of Recycling...", has not been considered because the copy filed with the IDS was illegible.

The Browner speech is not probative of the state of the art at the time the invention was made because the speech was delivered on 10/17/1997, after applicant's effective filing date of 9/26/1996. Accordingly, applicant's arguments, if any, based on this reference alone are unpersuasive.

The Examiner makes similar arguments in relation to the: Novak and Bivins article published in 2000, EPA Clean Water Act Article published in 2003 and the Sierra Club article published in 2004.

Applicant's Response regarding IDS

The EPA project Summary has been resubmitted herein in a form that is believed to be legible. The Applicant requests that the Examiner consider such reference of record and indicate his consideration on the filed Form 1449.

Applicant understands the position of the Examiner regarding the remaining references.

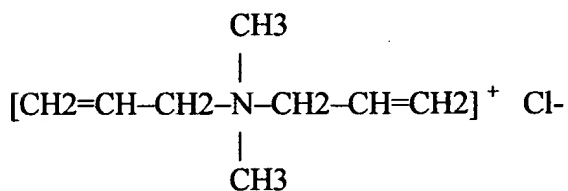
B. The Examiner's Argument's Pertaining to 35 USC § 112

❖ **Section 112, Second Paragraph:**

Claims 2-3 are rejected under 35 USC §112, second paragraph for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. In claim 2, it is unclear what a "(DADMAC) family of compounds" is because DADMAC is a unique compound. Similarly, in claim 3, it is unclear what an "(epi-DMA)" family of compounds is because epi-DMA is a unique compound.

Applicant at page 35 argues that the DADMAC "family of compounds" would cover for example, di-allyl, di-methyl ammonium chloride compounds varying in the chain length of the "allyl" group, i.e., wherein the "allyl" group would have from 4 to 6 or 7 or 8 carbons, or differing in the alkyl groups on the amine, e.g., di-methyl amine could be methyl-methyl amine or methyl ethyl amine or ethyl amine or ethyl methyl amine or methyl-propyl amine, and so on.

Applicant's arguments presupposes that DADMAC is a description of a genus of compounds rather than a single compound. The examiner and the applicant differ on this point. The examiner's position remains that di-allyl, di-methyl ammonium chloride is but a **single** compound. Specifically, it is a compound wherein each of the two "allyl" groups ("di-" allyl) is a 2-propenyl group bonded directly to the nitrogen of the nitrogen atom of the ammonium group, as shown below:



Moreover, if DADMAC meant di-alkyl ammonium chloride, then the abbreviation would have been DADAAC right? Applicant himself defined DADMAC as "di-allyl-di-methyl ammonium chloride."

Similar arguments apply to the epi-DMA "family of compounds" point. The examiner's position remains that epi-DMA stands for epichlorohydrin di **methyl** amine (see applicant's patent for this definition as well). If epichlorohydrin di-alkyl amine were intended, the abbreviation would have been epi-DAA, right?

It is helpful, the examiner feels, to review the context in which the “DADMAC variety” and “epi-DMA variety” phrases were used in the application. What applicant said in the original application was:

Examples of polymeric quaternary ammonium compounds are the di-allyl di-methyl ammonium chloride (DADMAC) variety and the epichlorohydrin di-methyl amine (epi-DMA) variety.

The point that Applicant was making was that suitable “polymeric quaternary ammonium compounds” suitable for use in the invention come in **two** varieties, namely, firstly, the single compound di-allyl di-methyl ammonium chloride and, secondly, the compound epichlorohydrin di-methyl amine. This interpretation is supported by another statement by applicant in the patent: Applicant stated:

Di-allyl di-methyl ammonium chlorides (DADMAC) and epichlorohydrin di-methyl amine (epi-DMA) are two preferred polyquaternary amines used in sludge dewatering. Both of these polyquaternary amine moieties have been found to provide sites for the dewatering of sludge from the thermophillic digestion process.
(emphasis added)

If applicant understood DADMAC to describe a genus of compounds (plural) and epi-DMA to describe a genus of compounds (plural), then he would not have referred to them as “**two** preferred polyquaternary amines” or the phrase “**both** of these polyquaternary amine moieties” (emphasis added).

In contrast, let’s see how another artisan (Hassick 5035808, col 2) addressed this issue:

Any water soluble di C₁ – C₈ alkyl diallyl ammonium polymer can be used with ferric sulfate. The preferred polymers are polydimethyl diallyl ammonium chloride (polyDADMAC), polydiethyldiallyl ammonium chloride (polyDEDAAC), polydimethyl diallyl ammonium bromide (polyDEDAAB). The most preferred dialkyl diallyl ammonium polymer is a homo polymer of dimethyl diallyl ammonium chloride.

The confusion of just what is meant by the “epi-DMA family of compounds” is exacerbated by varying the alkyl groups on the amine, i.e. [sic, “e.g.,”?] di-methyl amine could be methyl-methyl amine or methyl-ethyl amine...” The confusion of this remarks suggests that “di-methyl amine” and “methyl-methyl amine” differ with respect to the alkyl group. Such is not the case: Di-methyl amine is the very same compound as methyl-methyl amine.

Attempts after the fact of preparation and filing of the application 09/05870 which matured into the patent now the subject of reissue to squeeze additional substituted ammonium chloride

compounds other than epi-di-methyl amine from the stone of “polyquaternary ammonium compound” is not supported by the original disclosure.

❖ **Section 112, First Paragraph**

Claims 2-3 are rejected under 35 USC Sec. 112, first paragraph, for failure of the application as filed to provide written support for a “DADMAC family of compounds” or an “epi-DMA family of compounds.” As noted above, the application supports two (and only two polymeric quaternary ammonium compounds: the di-allyl di-methyl ammonium chloride (DADMAC) variety or type of a polymeric quaternary ammonium compound, and the epichlorohydrin di-methyl amine (epi-DMA) variety or type of a polymeric quaternary ammonium compound.

Applicant’s Response to the Examiner’s Section 112 Rejections

To address the Examiner’s rejections under Section 112, first and second paragraphs, Applicant has amended Claims 2, 3 and 20 to read as follows:

2. The method for dewatering thermophilic biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is of the di-allyl di-methyl ammonium chloride (DADMAC) variety.

3. The method for dewatering thermophilic biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is of the epichlorohydrin di-methyl amine (epi-DMA) variety.

20. The sludge of claim 19, wherein the polyquaternary ammonium compound is of the DADMAC variety and/or of the epi-DMA variety.

In all three cases the term “family of compounds” has been replaced with the word “variety.” As such, the Applicant respectfully submits that the claim amendments favorably overcome the Examiner’s rejections under section 112, first and second paragraphs.

The terms “DADMAC variety” and “epi-DMA variety” appearing in the claim amendments are supported from many locations of the specification, specifically:

- “The primary component in the five versions is a polyquaternary amine, preferably of the di-allyl di-methyl ammonium chloride (DADMAC) variety and from the epichlorohydrin di-methyl amine (epi-DMA) variety.” [Abstract]

- “Examples of polyquaternary ammonium compounds are the di-allyl di-methyl ammonium chloride (DADMAC) variety and the epichlorohydrin di-methyl amine (epi-DMA) variety.” [Col. 1, lines 17 – 21]
- “The primary component in the five versions is a polyquaternary amine, preferably of the di-allyl di-methyl ammonium chloride (DADMAC) variety and from the epichlorohydrin di-methyl amine (epi-DMA) variety.” [Col. 5, lines 7 – 10]

Additional support for the use of the term “variety” in the amended claims stems from the Applicant’s repeated disclosure of embodiments employing a “polyquaternary amine.”

- “The primary component in the five versions is a polyquaternary amine.” [Abstract]
- “Examples of polyquaternary ammonium compounds are,” [Col. 1, lines 17 – 18] and
- “The primary component in the five versions is a polyquaternary amine.” [Col. 5, lines 6 - 8]

In no case has Applicant placed a restriction or a limitation on the “polyquaternary amine.” Referring to Webster’s Dictionary (1990), the word “example” is defined as:

- 1: one that serves as a pattern to be imitated or not to be imitated,
- 3: a particular single item, fact, incident, or aspect that is representative of all of a group or type,
- 4: a parallel or closely similar case esp. when serving as a precedent or model,
- 5: an instance (as a problem to be solved) serving to illustrate a rule or precept or to act as an exercise in the application of a rule

Applicant has repeatedly defined “preferred” embodiments of the polyquaternary amine to be “of the DADMAC variety” and “from the epi-DMA variety.” **Applicant has not limited these preferred embodiments to DADMAC alone or to epi-DMA alone.** If Applicant had intended to limit its exemplary preferred embodiments to DADMAC alone, or epi-DMA alone, (which is not the case), Applicant would not have used the language “of the [] variety” or “from the [] variety” (or “from [] family”). As such, contrary to the Examiner’s contentions, Applicant’s specification does not recite that

"DADMAC" is the only possible preferred embodiment of a DADMAC variety, nor is "epi-DMA" the only possible preferred embodiment from an epi-DMA variety.

The use of the language "of the variety" or "from the variety" or "from the family" speaks to more than just a singular item. Applicant discloses these two preferred examples and uses the words (prepositions) "of" and "from", e.g., "**of** the DADMAC variety" and "**from** the epi-DMA variety" to indicate that there are multiple types of each.

The Examiner appears to be attempting to interpret the phrase in the specification "The primary component in the five versions is a polyquaternary amine, preferably of the di-allyl di-methyl ammonium chloride (DADMAC) variety and from the epichlorohydrin di-methyl amine (epi-DMA) variety" to mean "preferably DADMAC and epi-DMA". The Examiner's interpretation is contrary to the plain meaning set out in the specification. Applicant used the word "variety" twice in this clause in conjunction with the word "preferably". As such, contrary to the Examiner's interpretation, the word "variety" used in conjunction with "of the DADMAC variety" indicates that Applicant is referring to varieties of DADMAC as preferred embodiments; similarly, the word "variety" used in conjunction with "from the epi-DMA variety" indicates that Applicant is referring to varieties of epi-DMA as preferred embodiments. All of these DADMAC varieties and epi-DMA varieties are in turn preferred polyquaternary amines.

Applicant's position is supported by the plain meaning of the word "variety", which according to Webster's Dictionary (1990), and as previously presented to the Examiner, means:

- 1:** the ability or state of having different forms or types,
- 2:** a number or collection of different things esp. of a particular class,
- 3a:** something differing from others of the same general kind, and
- 3b:** any of various groups of plants or animals ranking below a species.

Additionally, the Applicant's use of the prepositions "of" (typically meaning "derived or coming from") and "from" (typically meaning "as the source" or "out of") lend further support to Applicant's interpretation that: "of the DADMAC variety" does not just mean DADMAC and that "from the epi-DMA variety" does not just mean epi-DMA. One of

Applicant's preferred polyquaternary amine embodiments is "of the DADMAC variety," inclusive of DADMAC not limited to DADMAC. Similarly, another of Applicant's preferred polyquaternary amine embodiments is "from the epi-DMA variety," inclusive of epi-DMA, not limited to epi-DMA.

As previously communicated to the Examiner, there exist many variants of the polyquaternary amine moiety. These variants are known in the art (e.g., Hassick '808 DADMAC variants noted by the Examiner). DADMAC is but one of many potential polyquaternary amine moieties and DADMAC has many known variants "of the DADMAC variety". While DADMAC is a polyquaternary amine, DADMAC is only one of many polyquaternary amine moieties of the DADMAC variety; the same argument applies to variants from the epi-DMA variety.

As further support for Applicant's use of the word "variety" in the referenced amended claims, the word "family" (e.g., from Webster's Dictionary, 1990, "4: a group of things related by common characteristics, and 4a: a closely related series of elements or compounds.") is used in a context that similarly does not limit the disclosure to DADMAC or epi-DMA alone:

- "In method five as well, the polyquaternary ammonium compounds are from DADMAC family or from epi-DMA family." [Col. 8, lines 38 – 40]

Thus, compounds "from the DADMAC family" are not limited to DADMAC alone, nor are compounds "from the epi-DMA family" limited to epi-DMA alone.

Additionally, other areas of the specification support the Applicant's position.

- "It is to be understood that the descriptions of this invention are exemplary and explanatory, but are not restrictive, of the invention. Other objects and advantages of this invention will become apparent from the following specification and from any accompanying charts, tables, examples and drawings." [Col. 4, lines 37 – 42]
- "The present invention is described in connection with one or more preferred embodiments. However, it should be understood that the invention is not limited to those embodiments. In contrast, the invention includes all alternatives, modifications and equivalents as may be included within the spirit and scope of the specification and of the appended claims." [Col. 4, lines 54 – 61]

- "Certain objects are set forth above and made apparent from the foregoing description and examples. However, since certain changes may be made in the above description and examples without departing from the scope of the invention, it is intended that all matters contained in the foregoing description and examples shall be interpreted as illustrative only of the principles of the invention and not in a limiting sense. With respect to the above description and examples then, it is to be realized that any descriptions, drawings and examples deemed readily apparent and obvious to one skilled in the art and all equivalent relationships to those stated in the specification are intended to be encompassed by the present invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention. It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall in between." [Col. 12, lines 54 – 61]

Further, as evidenced in the file history of Haase '750, the specification of the parent application, 08/721,557, makes the same presentations as in the '750. Specifically, in the '557 application page 2, lines 11 through 13 states:

"Examples of polyquaternary ammonium compounds are the di-allyl di-methyl ammonium chloride (DADMAC) variety and the epichlorohydrin di-methyl amine (epi-DMA) variety."

And, the abstract states:

"The primary component in the five versions is a polyquaternary amine, preferably of the di-allyl di-methyl ammonium chloride (DADMAC) variety and from the epichlorohydrin di-methyl amine (epi-DMA) variety."

Therefore, Applicant respectfully submits that the claims, as amended, are fully supported and that Applicant is not attempting to "squeeze additional substituted ammonium chloride compounds and additional substituted di-alkyl amine compounds or epi-dialkyl amines other than epi-di-methyl amine from the stone of 'polymeric quaternary ammonium compounds'" as the Examiner contends. Rather, Applicant respectfully asserts that the scope of protection he seeks in the pending claims is already supported in the specification. As detailed above, amended Claims 2, 3 and 20 are supported by the

specification in many cited locations, and their scope is not subject to the narrow interpretation proffered by the Examiner. As such, Applicant respectfully submits that Claims 2, 3 and 20, as amended are in condition for allowance.

Applicant agrees with the Examiner that DADMAC itself is a single compound; however, the preferred DADMAC embodiment is not limited to DADMAC itself, but instead includes DADMAC and embodiments "of the DADMAC variety". Applicant also agrees with the Examiner that epi-DMA itself is a single compound; however, the preferred epi-DMA embodiment is not limited to epi-DMA itself, but instead includes epi-DMA and embodiments "from the epi-DMA variety". DADMAC variety and Epi-DMA variety are described as preferred embodiments, wherein DADMAC is a species within the genus "DADMAC variety" and epi-DMA is a species within the genus "epi-DMA variety." The Applicant agrees with the Examiner that di-alkyl ammonium chloride could be abbreviated DADAAC; however, it is perfectly reasonable to conclude that DADAAC is of the DADMAC variety, especially as the term "variety" is used in the specification and defined by Webster's dictionary, and interpreted in the industry. Likewise, Applicant agrees with the Examiner that epichlorohydrin di-alkyl amine could be abbreviated epi-DAA; however, it is perfectly reasonable to conclude that epi-DAA is of the epi-DMA variety, especially as variety is used in the specification, defined by Webster's dictionary and used in the industry.

Applicant appreciates the Examiner pointing out a typographical error in Applicant's prior remark, wherein the Examiner states in part:

"The confusion of just what is meant by the "epi-DMA family of compounds" is exacerbated by Applicant's remark that "a family of compounds can be prepared by varying the alkyl groups on the amine, i.e. [sic, "e.g.,"?] di-methyl amine"

For the sake of clarity, Applicant agrees that the signal "e.g." was intended instead of the signal "i.e."

Based on the foregoing, Applicant respectfully submits that the Examiner's claim rejections under section 112, first and second paragraphs, have been traversed. As such, Applicant requests allowance of claims 2 and 3 (as well as 20) as amended herein.

❖ **Examiner's Section 112 Rejection Pertaining to New Matter**

Claim 9 is rejected under 35 USC Sec. 112, first paragraph, for failure of the original specification to describe the claimed invention. The recited ratio range of 50 ppm:1 % - 350 ppm:1 % is not supported by the range of 50 ppm:1 % - 300 ppm:1% (col 6 line 53).

Applicant's Response

Applicant has amended claim 9 to correct the recited ratio range to read "50 ppm: 1% - 300 ppm:1%." As such, Applicant respectfully submits that that this amendment overcomes the Examiner's rejection, and requests allowance of Claim 9.

C. The Examiner's Double Patenting Rejection

Claims 1 – 13, 15 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 – 14, 16 of U.S. Patent No. 5,846,435 to Haase in view of USP 3,472,767 to Lees. ...

Claims 16 – 18, 21 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 15 of U.S. Patent No. 5,846,435 to Haase in view of USP 3,472,767 to Lees. ...

Claims 19 – 20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 15 of U.S. Patent No. 5846435 to Haase in view of USP 3,472,767 to Lees, as noted above, further in view of Sorensen '433. ...

Applicant's Response

Per the Examiner's suggestion, Applicant submits with this response a terminal disclaimer in compliance with 37 CFR 1.321(c) regarding Applicant's commonly owned Haase USP 5,846,435. In view of this terminal disclaimer, Applicant respectfully submits that the Examiner's rejections of certain claims under the judicially created doctrine of obviousness-type double patenting are traversed, and that such claims are in order for allowance.

III. CONCLUSION:

Applicant respectfully requests entry of this amendment, along with favorable reconsideration of the pending claims. This amendment places the claims in a condition for allowance. The amendments to the claims do not raise any new matter issues and no additional searching would be required. Additionally, Applicant requests that in view of this fact, the amendment be entered, and after due consideration of the facts presented herein, the claims be allowed and a certificate be issued.

Enclosed is Applicant's check in the amount of \$60 regarding the \$60 fee for filing of this response as required by 37 C.F.R. § 1.136(a) and 1.17(a)(1), along with the \$55 fee for the filing of the terminal disclaimer as required by 37 C.F.R. § 1.321(c) and 1.20(d). No other fees are thought to be necessary. To facilitate the resolution of any issues or questions presented by this paper, Applicant respectfully requests that the Examiner directly contact the undersigned by phone to further the discussion, reconsideration and allowance of the claims.

Respectfully submitted,



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